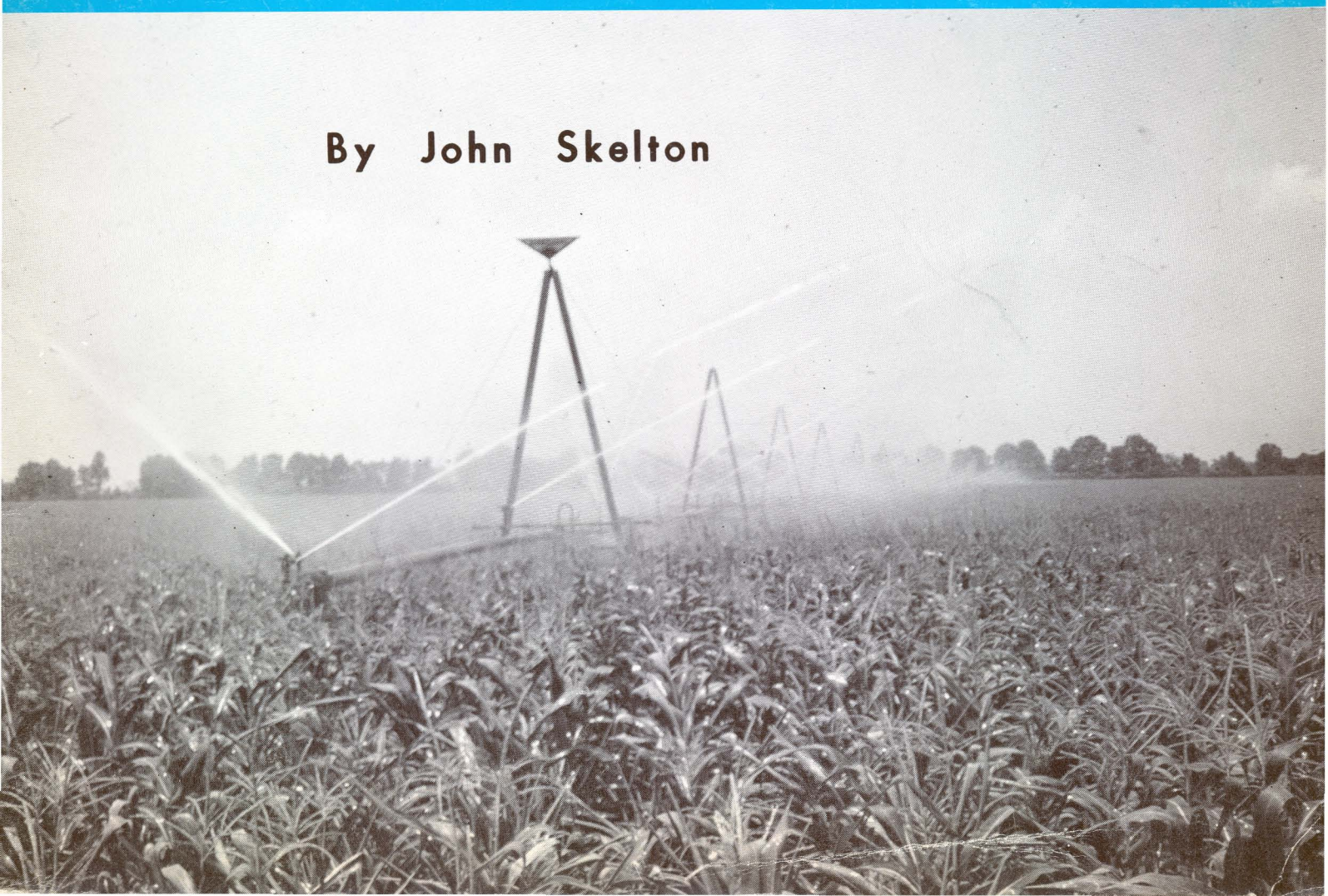
Water Resources Report 25

BASE-FLOW RECESSION CHARACTERISTICS AND SEASONAL LOW-FLOW FREQUENCY CHARACTERISTICS FOR MISSOURI STREAMS

By John Skelton



COVER: *Spray-type irrigation such as this is used in parts of Missouri. Water management practices need to be strengthened to assure an adequate amount of water for irrigation as well as all other water needs. (Photo courtesy Agricultural Extension Service, Columbia, Mo.)*

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By John Skelton

WATER RESOURCES DIVISION, U.S. GEOLOGICAL SURVEY
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July 1970 Rolla, Mo.

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BASE-FLOW RECESSION CHARACTERISTICS AND SEASONAL LOW-FLOW FREQUENCY CHARACTERISTICS FOR MISSOURI STREAMS

By John Skelton

ABSTRACT

This report presents the results of a hydrograph analysis of base-flow recessions and a statistical study of seasonal low-flow information for Missouri streams. Base-flow recession characteristics of 116 continuous and partial-record stations are contained in appendix 1 of the report, and seasonal low-flow frequency information for 215 continuous and partial-record stations are presented in appendix 2. The information will be useful in administering future water laws in the State and in other studies involving the utilization of low flows.

Base-flow recession characteristics for the growing season (May through October) were determined for average and maximum depletion rates from gaging station hydrographs. Points of transition between storm and base-flow recessions, as determined by the intersection of trend lines through storm and base-flow recession data, ranged from 50- to 90-percent duration on station flow-duration curves.

Seasonal low-flow frequency information was computed from annual June through August minimums to provide low-flow frequency data for the irrigation season. The average ratio of seasonal to annual low-flow frequency events for the 7-day period is about 1.5:1 for the Springfield Plateau, 2.1:1 for the Southeastern Lowlands, 3.2:1 for the Till and Osage Plains, and 1.1:1 for the Salem Plateau.

DEFINITION OF TERMS

Base flow – For this report, base flow is defined as "dry-weather discharge of the stream". This flow has been reduced by evapotranspiration and seepage losses and therefore does not represent the total contribution from ground-water sources.

Base-flow recession curve – A hydrograph which defines the decreasing rate of runoff of the stream during periods of base flow when there is no precipitation or surface runoff.

Basin seepage run – A series of discharge measurements made to identify stream reaches in which there are gains or losses in base flow.

Continuous-record gaging station – A site on a stream where continuous records of discharge are obtained.

Cubic feet per second (cfs) – A unit expressing rate of discharge. One cfs is the rate of discharge of a stream having a cross-sectional area of 1 square foot and an average velocity of 1 foot per second.

1 cfs = 0.646 million of U.S. gallons per day.

Hydrograph – A graph which represents the flow of a stream with respect to time.

Low flow – The discharge of a stream which is less than the median flow. The low flow of a stream may include some surface runoff whereas the base flow does not.

Partial-record gaging station – A site on a stream where base-flow data are collected systematically over a period of years

Recurrence interval – The average interval of time between occurrences of a low flow less than that of a given magnitude.

Seasonal low flow – That flow which occurs during the period June through August.

Storm-flow recession curve – A hydrograph which defines the rapid depletion rate of a stream immediately following a flood peak.

INTRODUCTION

Increases in population and attendant increasing demands on Missouri's surface-water resource have made it imperative to strengthen water management practices so that an adequate supply of surface water can be maintained for all users. Although Missouri has no specific water management law at present (1970), a bill proposing such legislation has recently been submitted to the State legislature, and it is likely that a water law will be enacted in the near future. An immediate need for interpretive streamflow information will exist at that time.

To help fill this need, the low-flow characteristics of Missouri streams during the growing and irrigation season have been described in this report by analyzing seasonal low-flow frequency and base-flow recession characteristics. The need for annual low-flow frequency data and flow-duration data was met by an earlier report in this series (Skelton, 1966).

The primary purpose of this report, then, is to describe the seasonal low-flow frequency and base-flow recession characteristics of Missouri streams for use in allocating water rights and administering future water laws. The data will also be useful in evaluating adequacy of streamflow for waste disposal, in evaluating the amount of streamflow available for future developments, and in hydrograph separation studies.

ACKNOWLEDGMENTS

The interpretive data contained in this report are based on streamflow information collected by the Water Resources Division of the U.S. Geological Survey in cooperation with the Missouri Geological Survey and Water Resources, William C. Hayes, State Geologist and Director. The work was performed in the Missouri district of the Water Resources Division, U.S. Geological Survey, under the direction of Anthony Homyk, Jr., District Chief.

BASE-FLOW RECESSION CHARACTERISTICS

The primary use of the base-flow recession information presented in this report is to estimate the amount of water which will be flowing in the stream during rainless periods of about 30 days or less. During drought periods, when a judicious allocation of available surface water is essential, an accurate forecast of the amount of water which will be flowing in the stream at some future date will be vital to the responsible State agencies and water managers. Thus, recession information will be a valuable tool in administering water laws in Missouri and in other studies involving the utilization of low flows.

Definition of recession curves from daily discharge hydrographs has been described by various investigators (see "selected references"). The reader is referred to these publications for information concerning various methods of constructing recession curves and the theoretical concepts involved.

For this report, base-flow recession curves were defined for long-time continuous-record stations using methods described by Hanson (pers. comm., 1969) and Saboe (1966). To encompass Missouri's growing season, the curves were based on recession data from the period May through October and are applicable to these months only. By graphical regression analysis, estimates of several points on the base-flow recession were determined for short-time continuous-record stations and low-flow partial-record stations. Selected points on the recession curves are presented in appendix 1 for all stations where estimates were possible. The location of the data collection points is shown on maps in Water Resources Reports 20 and 22. Further information on station locations may be obtained from the District Chief, Water Resources Division, P. O. Box 340, Rolla, Mo. 65401.

Recession characteristics are defined in this report for most streamflow records of the Ozarks and Southeastern Lowlands, but for only a few of the Till and Osage Plains streams (fig 1). This is because base-flow recession data are of very little value in areas where base flows are small and poorly sustained (H.C. Riggs, pers. comm., 1969), and most Till and Osage Plains streams fall into this category. The base flows of Ozark and Southeastern Lowland streams are generally high and well-sustained.

DEFINING BASE-FLOW RECESSION CURVES FROM STREAMFLOW HYDROGRAPHS

The selection of suitable base-flow recessions from the streamflow hydrograph is a rather subjective procedure. Most hydrographs show a gradual transition from storm flow to base flow, and certain assumptions must be made regarding this transition in order to select representative recessions.

For this study, a point of transition was assumed for each long-time station. The transition point was determined graphically from the streamflow records as follows:

1. All points from suitable storm and base-flow recessions for each station were plotted on logarithmic graph paper.

2. Trend lines were fitted to the upper and lower data points.

3. The intersection of the trend lines was chosen as the approximate upper limit of base flow (fig. 2).

When chosen in this manner the initial discharges (or upper limits) of the base-flow recession curves ranged from about 50- to 90-percent duration on the flow-duration curves for the gaging stations (see Skelton, 1966, p. 29, for flow-duration data). There were only seven initial discharges in the 50- to 70-percent range, and these represented Ozark streams with very high, well-sustained base flows. All other initial discharges ranged from 80 to 90 percent on the duration curves.

Storm and base-flow recessions were not used in the analysis if there was a possibility that runoff was sustained by concurrent precipitation. A study of precipitation records was made to determine which recessions should be omitted from the analysis for this reason.

HOW TO USE BASE-FLOW RECESSION CURVES

An example of base-flow recession curves for a long-term continuous-record station is shown in figure 3. Curve A represents the average rate of depletion

of base flow during periods of negligible precipitation. Variations in weather, soil moisture, and groundwater storage may cause significant deviations from this average rate. Curve B defines the maximum base-flow recession rate or maximum deviation from the average that has been experienced during the period of record at the gaging station. This curve should be used to obtain conservative estimates during long periods of extremely hot summer weather when evapotranspiration rates are excessive.

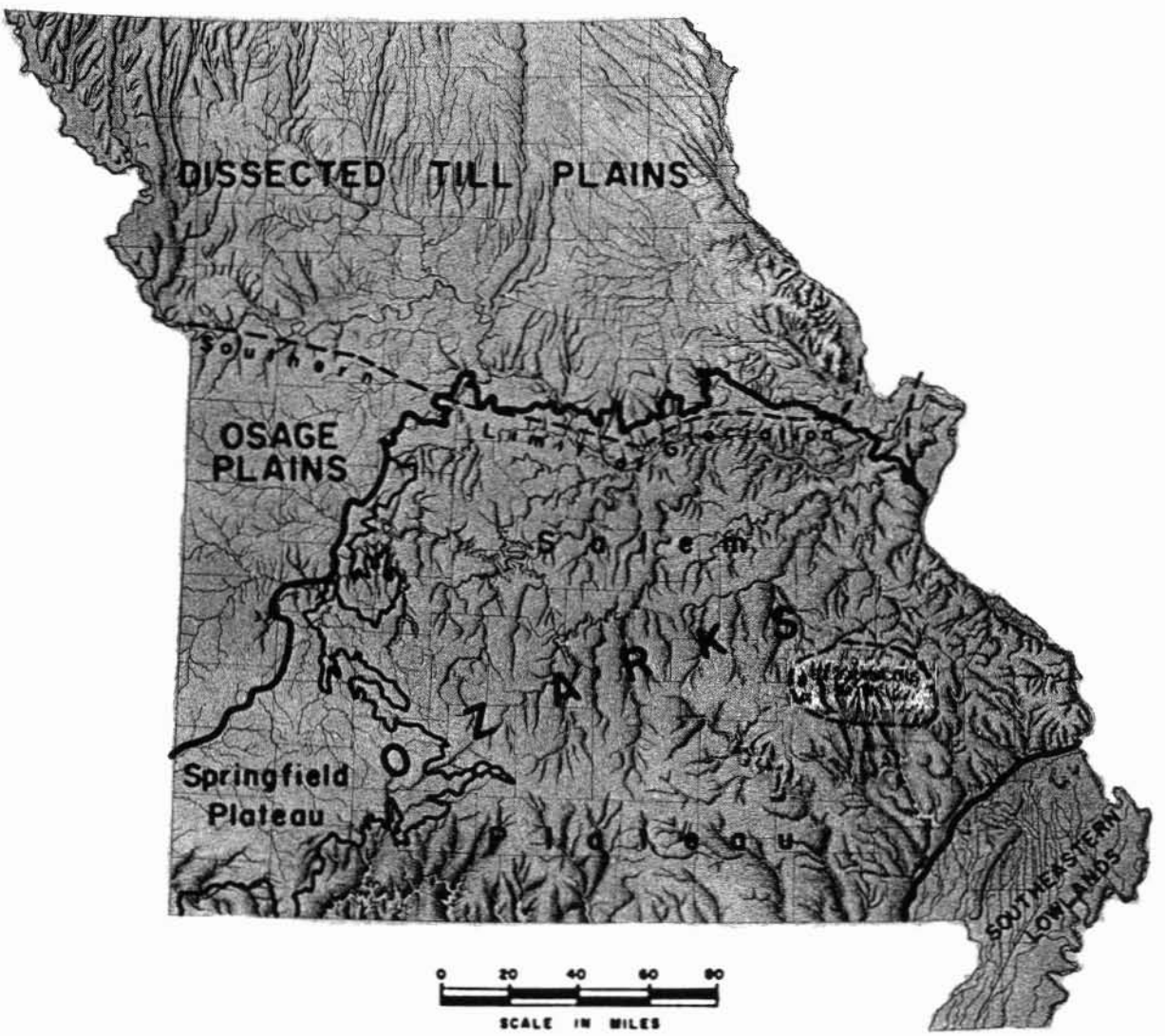

Figure 1

Physiographic regions of Missouri. From Physiography, *in* Mineral and water resources of Missouri: Mo. Geol. Survey and Water Resources, Ser. 2, Vol. 43, p. 14, 1967.

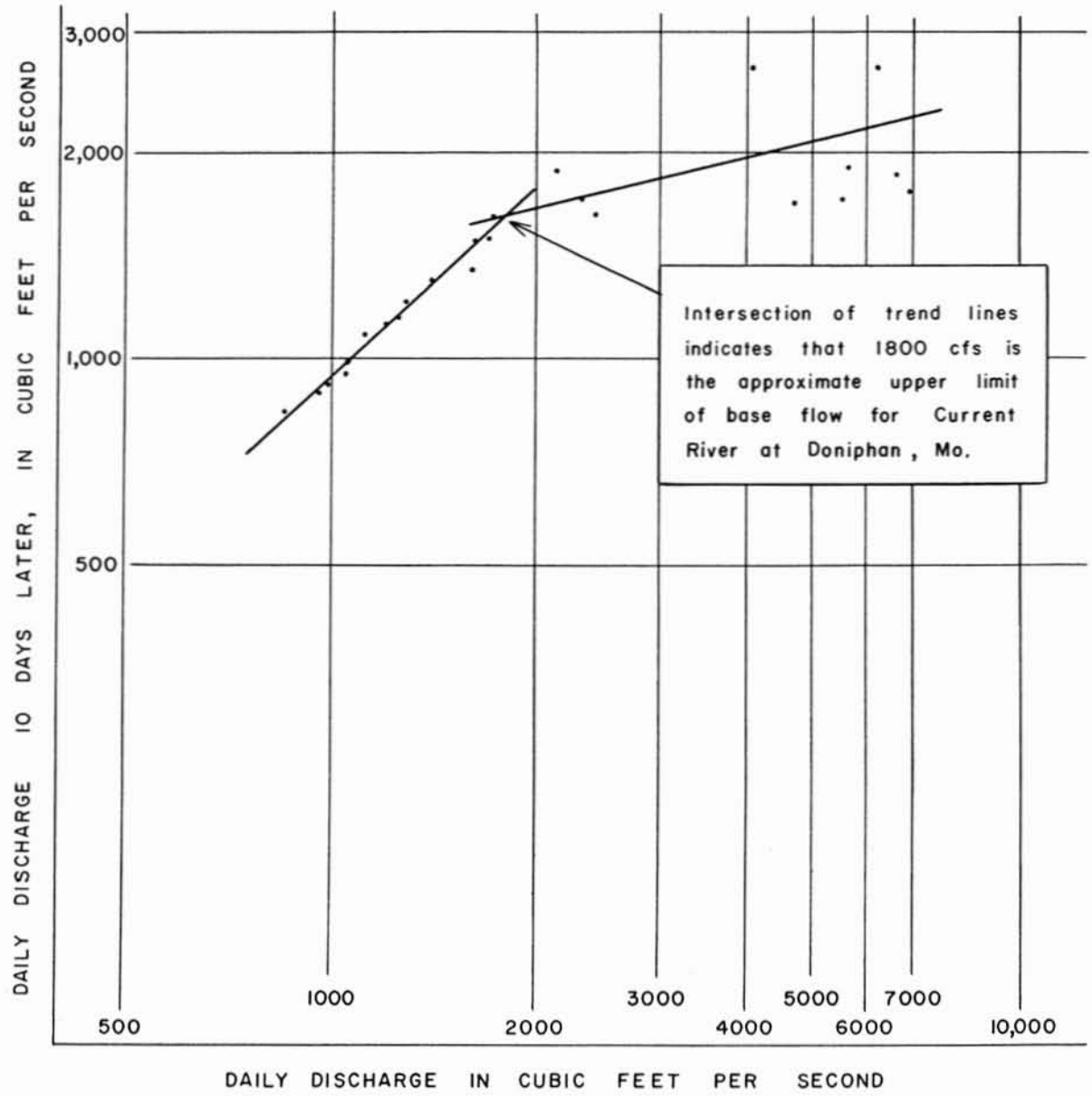

Figure 2

How recession data are used to determine upper limit of base flow.

In order to use the station data presented in appendix 1, the following procedures are necessary:

1. To obtain a base-flow recession curve, plot the tabular station data on semi-logarithmic graph paper, using the arithmetic scale as the time scale (see fig. 3).

2. Determine the discharge to be used as the initial point on the recession. Assume, for example, that the base flow of Current River at Doniphan is approximately 1,000 cfs and that the user wishes to estimate the flow which will occur 30 days later, assuming average evapotranspiration rates and no surface runoff during the period.

3. Enter figure 3 with a discharge of 1,000 cfs, which corresponds to a value of 66 days on the time scale.

4. Add the forecast period (30 days) to the time at initial discharge (66 days) and obtain 96 days.

5. Enter the time scale at 96 days and estimate the forecast discharge from Curve A to be 880 cfs. Note that this estimate could have been approximated directly from appendix 1. This is possible only when the initial discharge happens to be equal or nearly equal to one of the values presented in the table. In most cases, a graphic plot will be necessary.

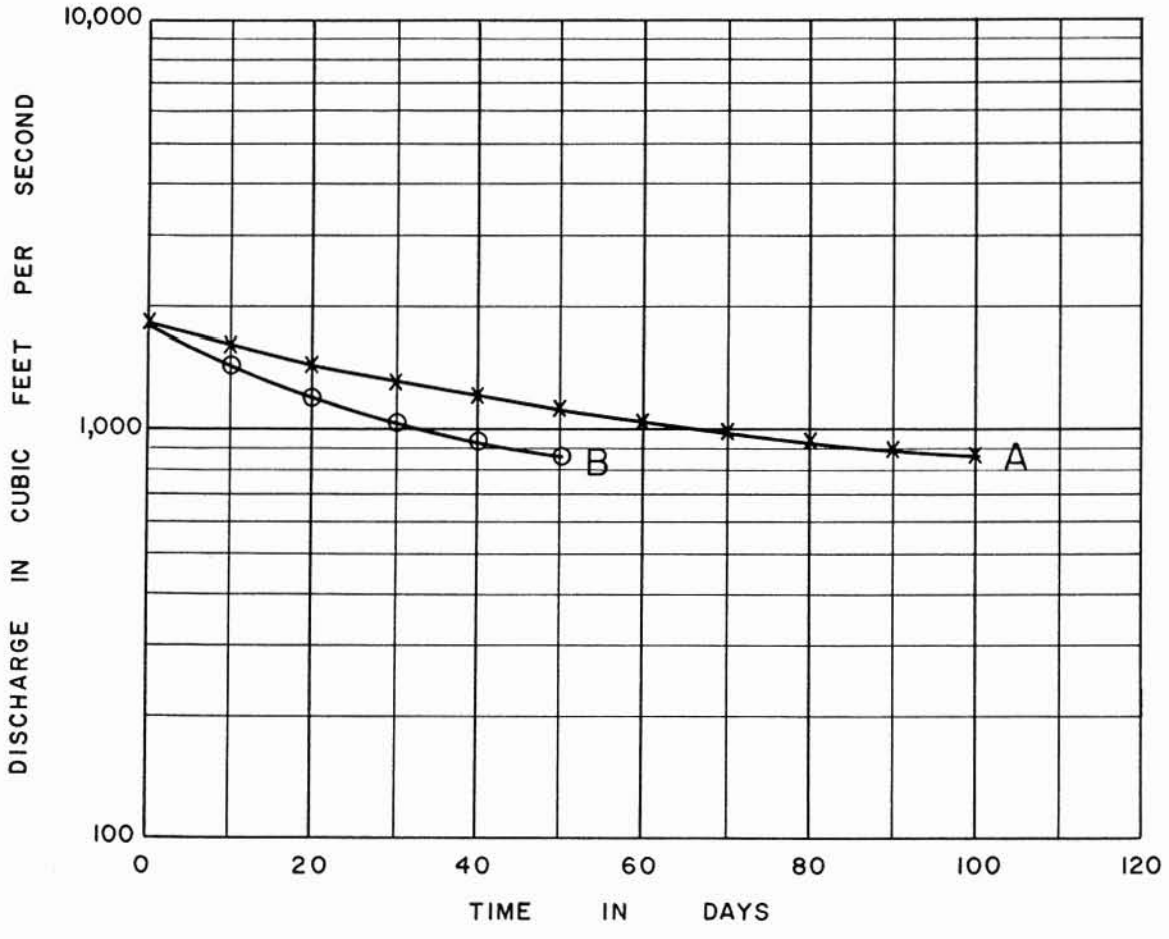

Figure 3

Base-flow recession curves, Current River at Doniphan, Mo.

SEASONAL LOW-FLOW FREQUENCY CHARACTERISTICS

Seasonal low-flow frequency determinations for the period June through August are presented in appendix 2. This information was developed for continuous and partial-record gaging stations using methods of computation for annual events described in a report by Skelton (1966). That report should also be consulted for gaging station location maps and information about statewide variations in the low-flow characteristics of streams.

Seasonal low-flow frequency data will be especially useful in implementing State water laws. More water for irrigation is available from surface streams in Missouri during June through August than during the period of annual minimums in the fall. For example, the average ratio of seasonal to annual low-flow frequency events for the 7-day period is about 1.5:1 for the Springfield Plateau, 2.1:1 for the Southeastern Lowlands, and 3.2:1 for the Till and Osage Plains.

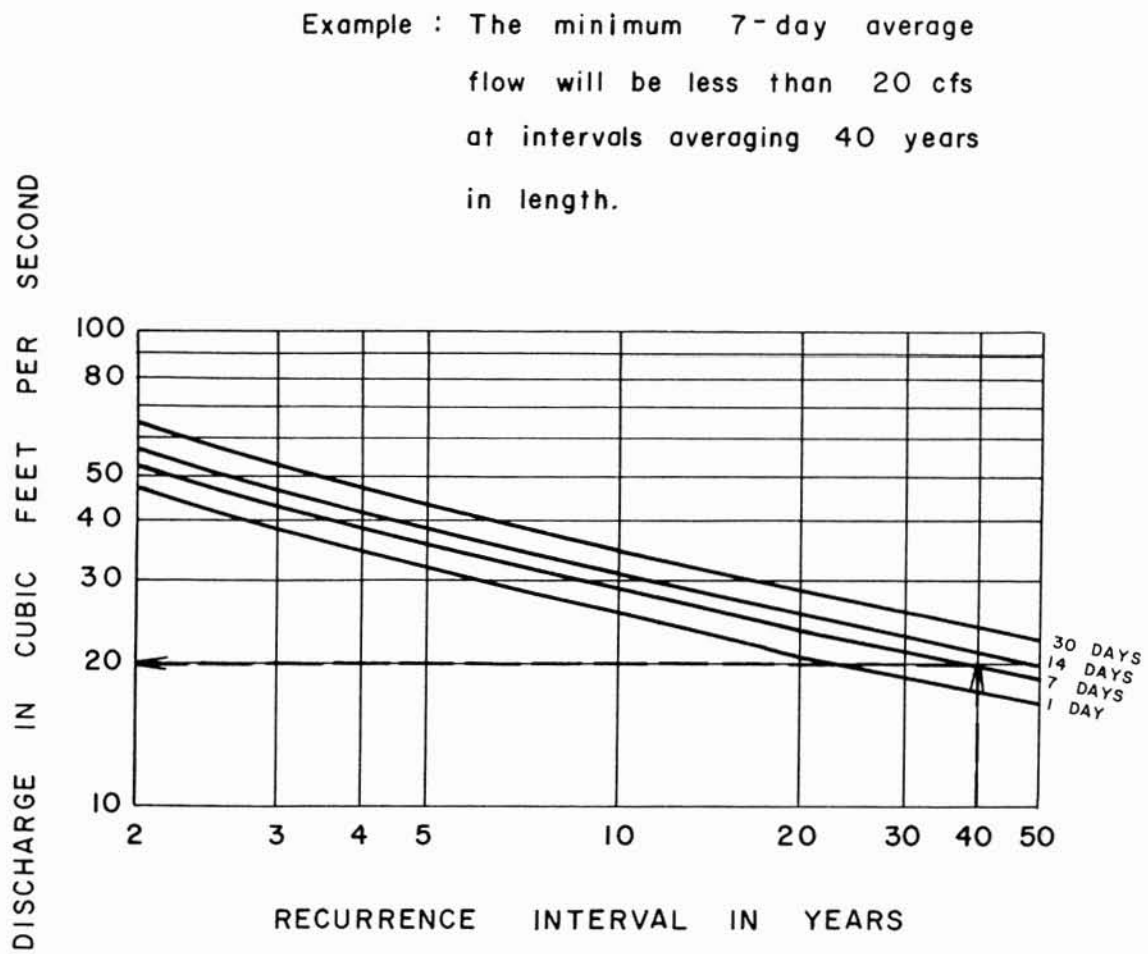

Figure 4

Seasonal low-flow frequency curves, Castor River at Zalma, Mo.

Seasonal low-flow data were not presented for streams in the Salem Plateau region (fig. 1) because the ratio between seasonal and annual low-flow events is small (about 1.1:1). Annual frequency data should be used when estimates are needed in this region.

The June through August period was chosen for the analysis because most supplemental irrigation occurs during these months. Although June is generally a month of abundant rainfall in Missouri, there have been some notable exceptions. For example, a 44-day "dry period" (less than 0.2 inches of rain in 24 hours) began at Rolla, Mo., on June 12, 1934 (Decker, 1958).

INTERPRETATION OF SEASONAL LOW-FLOW FREQUENCY DATA

Figure 4 is a presentation of seasonal low-flow frequency curves for a long-time continuous-record gaging station. Similar curves for other Missouri gaging stations were the basis for the data presented in appendix 2. The basic assumption made in using these curves is that the distribution they depict is a good representation of the population distribution.

In figure 4, note that the recurrence interval for a discharge of 20 cfs for a 7-day period is about 40 years. This means that the minimum 7-day average flow will be less than 20 cfs at intervals averaging 40 years in length; or, putting it another way, the probability is one in 40 that the minimum 7-day average discharge will be less than 20 cfs in a given year.

The recurrence intervals presented in appendix 2 are averages and do not imply regularity of occurrence; an event of 10-year recurrence interval may be exceeded in consecutive years or it may not be exceeded in a 20-year period. For example, during the years 1922-66 the seasonal minimum 7-day flows for Castor River at Zalma were less than 29 cfs, the discharge with a 10-year recurrence interval, in 1936, 1937, 1941, and 1944; a total of 4 times in 45 years. This is in close agreement with the average frequency of the event, but the intervals between occurrences were irregular.

LIMITATIONS OF DATA

The seasonal low-flow frequency and base-flow recession information presented in the appendices provide estimates of the probable frequency and distribution of future low flows, provided no appreciable man-made changes occur. When natural conditions are significantly altered in a basin, the flow regimen will change and additional study will be required before estimates can be made.

The methods of analysis contained in this report are applicable to essentially unregulated flow patterns and thus do not apply to regulated streams. The natural flows of such streams as the Mississippi, Missouri, White, and Osage Rivers are regulated by upstream dams, reservoirs, and diversions; and a study of their low-flow characteristics is beyond the scope of this report. If base-flow recession or seasonal low-flow frequency information are needed downstream from major impoundments or diversions, a detailed study of the pattern of regulation will be necessary before reasonable estimates can be made.

The base-flow recession information presented in this report is derived from relatively short base-flow recessions and may not define the true recession for long, dry periods of several months. The maximum length of forecast using the data of appendix 1 should be about 30 days.

The use of base-flow recession data should be restricted to making forecasts of the total amount of water which will be flowing in the streams at a future date. The total flow of the stream, as forecast from the recession data, has been affected by evapotranspiration and seepage losses and may include flow from channel and bank storage and from shallow aquifers. Thus, further refinement of the data would be necessary for other studies, such as the delineation of ground-water outflow from deep aquifers.

Extrapolation of the station data in the appendices should be avoided. All available information was utilized in defining these data; unrealistically high or low values may result from upward or downward extensions.

LOW-FLOW CHARACTERISTICS AT UNGAGED SITES

Generally, only rough estimates of low-flow characteristics are possible at ungaged sites in Missouri, especially in the Ozarks. This is because low-flow characteristics of streams in adjacent basins may be greatly different without the fact being discernible from known basin characteristics.

The recommended procedure for estimating low-flow characteristics at an ungaged site is as follows:

1. Obtain a few low-flow discharge measurements at the site, preferably on different recessions in several different years.

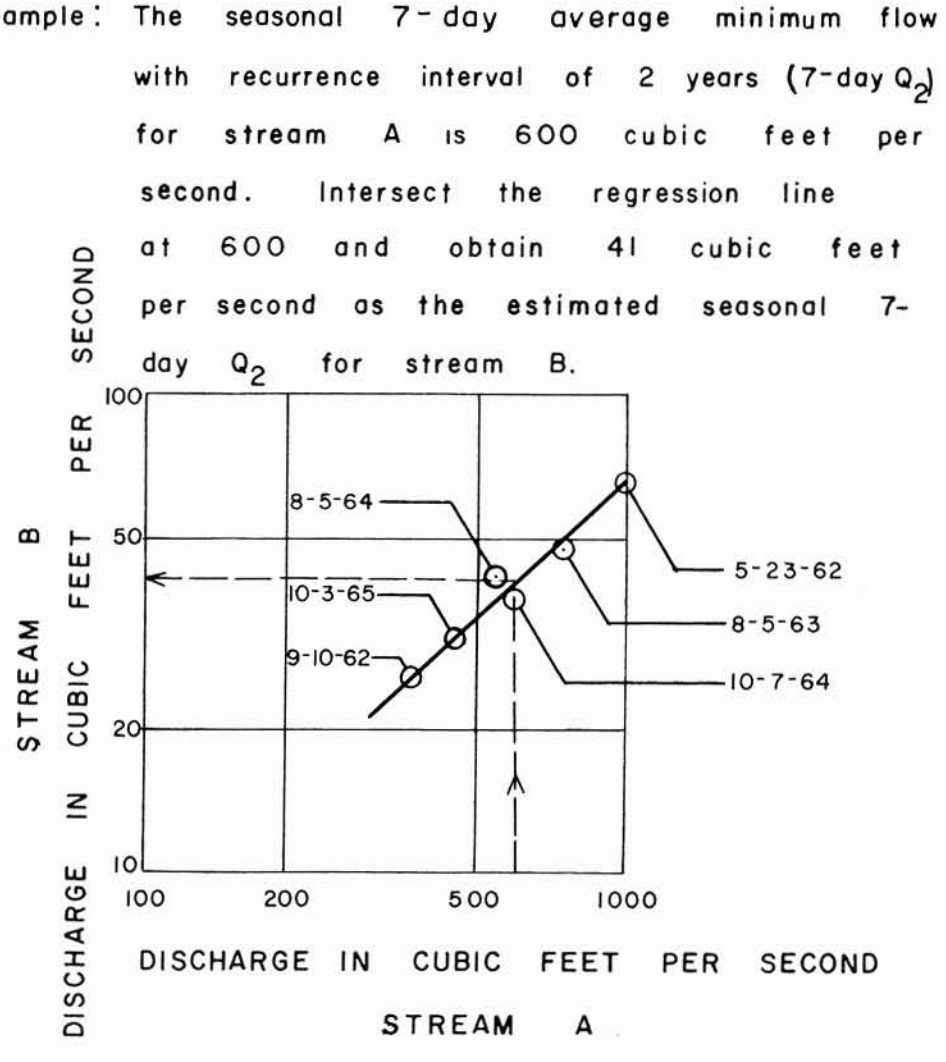

Figure 5

A graphical procedure for estimating low-flow characteristics.

2. Relate the measurements at the site to concurrent discharges at nearby continuous-record stations to obtain estimates of low-flow characteristics at the site.

Figure 5 illustrates this procedure. In general, a regression line such as that of figure 5 will produce a reliable estimate of median values (the 2-year recurrence interval on the frequency curves) and estimates of less reliability for more extreme events. Simple graphical procedures are considered adequate because the effects of basin characteristics and sampling errors on the slope and position of the regression line are always much greater than the effects of errors made in fitting a curve by eye to plotted points.

When estimates are needed immediately at a site and there is no time for low-flow measurements, it would be wise to find out if any data have ever been collected at or near the site. For many years, low-flow measurements have been made by the U.S. Geological Survey at various sites throughout the state, especially during significant droughts. These miscellaneous measurements may be categorized as follows:

1. Flow measurements and estimates at widely scattered points in an area.

2. Closely spaced flow measurements and estimates on a stream and its tributaries during basin seepage runs. Seepage run data are presently (1969) available for all or parts of the following streams: Big, Current, Eleven Point, Gasconade, James, Meramec, Middle Fork Black, North Fork, Sac, Spring, and West Fork Black Rivers; Bryant, Center, Courtois, Huzzah, Logan, Shoal, and Wilson Creeks.

It is possible to relate this information to data from the continuous and partial-record station network as described in the preceding paragraph.

The transfer of low-flow data from gaged to ungaged sites by use of drainage area ratios, interpolation, or extrapolation can usually provide acceptable results in the Southeastern Lowlands and Plains. However, these methods should only be used when the need for a quick answer is the overriding factor.

SUMMARY AND CONCLUSIONS

BASE–FLOW RECESSION CHARACTERISTICS

1. Base-flow recession characteristics of continuous and partial-record gaging stations are presented in appendix 1. This information can be used in estimating the amount of water which will be flowing in the stream during rainless periods of about 30 days or less. Recession information will be a valuable tool in administering water laws and in other studies involving the utilization of low flows.

2. The base-flow recession characteristics were based on the period May through October and are applicable to those months, only.

3. Base-flow recession characteristics are of little value in areas where base flows are generally small and poorly sustained. Therefore, this information was determined for the well-sustained streams of the Ozarks and Southeastern Lowlands, but for only a few of the Till and Osage Plains streams.

4. The upper limit of base flow for each long-term station was chosen as the point of intersection of trend lines drawn through storm and base-flow recession data. These points ranged from about 50- to 90-percent duration on the station flow-duration curves.

5. Average and maximum base-flow recession rates were defined for each gaging station.

SEASONAL LOW-FLOW FREQUENCY CHARACTERISTICS

1. Seasonal low-flow frequency characteristics were developed for continuous and partial-record gaging stations in the Till and Osage Plains, Southeastern Lowlands, and Springfield Plateau and are presented in appendix 2.

2. These data were based on the period June through August because the need for water for supplemental irrigation is greatest in Missouri during this period. Since more surface water is available during June through August than during the period of annual minimums in the fall, responsible agencies can more efficiently allocate water rights and administer water uses by basing decisions on seasonal frequency information.

3. The average ratio of seasonal to annual low-flow frequency events for the 7-day period is about 1.5:1 for the Springfield Plateau, 1.1:1 for the Salem Plateau, 2.1:1 for the Southeastern Lowlands, and 3.2:1 for the Till and Osage Plains.

LOW-FLOW CHARACTERISTICS AT UNGAGED SITES

1. Rough estimates of low-flow characteristics at ungaged sites are possible by regression analysis if a few discharge measurements are made at the site on different recessions in several different years.

2. Transfer of station data to other points on a stream or to adjacent basins should be avoided in the Ozarks because of the possibility of anomalous runoff patterns. In other physiographic regions of the State, the use of drainage area ratios and other methods can often give satisfactory results.

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APPENDIX 1

BASE-FLOW RECESSION CHARACTERISTICS FOR MISSOURI STREAMS

This appendix presents base-flow recession information for continuous-record and partial-record stations which have sufficient data for analysis.

Station number is a nationwide identification number used by the U.S. Geological Survey. It locates the station in relation to drainage basin and downstream direction along the main stream.

Station name and location presents the name of the streamgaging station and a reference to a nearby town. Exact station locations are shown on maps in Water Resources Reports 20 and 22. If further information concerning station locations is required, contact the District Chief, Water Resources Division, P.O. Box 340, Rolla, Mo.65401.

Drainage area is the most recent determination of this parameter and is based on the most accurate maps available. Drainage areas have not been determined for most partial-record stations; however, all partial-record stations listed have drainage areas greater than 20 square miles.

Record used in analysis shows the water years (October 1 to September 30) for which hydrographs or regressions were available for analysis of base-flow recession characteristics.

Minimum observed flow is the smallest discharge recorded during the period of record for continuous-record stations and is the smallest discharge measured at partial-record stations.

For all gaged sites where estimates were possible, an average recession rate (row A) and a maximum recession rate (row B) are defined. Row B should be used to obtain conservative estimates during long periods of extremely hot summer weather when evapotranspiration rates are excessive.

RECESSION DATA

(Row A represents an average recession and Row B represents the extreme recession to be expected.)
Unit of measure is cubic feet per second.

STATION NUMBER	STATION NAME	DRAINAGE AREA (sq. mi.)	RECORD USED IN ANALYSIS	MINIMUM OBSERVED FLOW (cfs)		TIME, IN DAYS 0	10	20	30	40	50	60	70	80	90	100
5-5075	Salt River near Monroe City	[a]2,230	1940-67	0	A	20	4.1	1.0	0.3	0.1	–	–	–	–	–	–
					B	20	0.9	0.1	–	–	–	–	–	–	–	–
5-5080	Salt River near New London	[a]2,480	1923-67	0	A	30	7.8	2.0	0.5	0.1	–	–	–	–	–	–
					B	30	3.1	0.3	–	–	–	–	–	–	–	–
6-8975	Grand River near Gallatin	[a]2,250	1921-67	2.2	A	25	12	6.4	3.8	2.5	–	–	–	–	–	–
					B	25	6.2	3.0	–	–	–	–	–	–	–	–
6-8981	Thompson River near Mt. Moriah [b,c]	891	1960-67	8.0	A	15	5.5	2.5	–	–	–	–	–	–	–	–
					B	15	2.5	–	–	–	–	–	–	–	–	–
6-8995	Thompson River at Trenton	1,670	1929-67	1.0	A	25	7.8	3.1	1.3	–	–	–	–	–	–	–
					B	25	3.3	0.9	–	–	–	–	–	–	–	–
6-8996.8	Grand River at Chillicothe [b]	–	1934, 1936, 1957-58, 1961-65, 1967	19	A	95	50	28	18	12	–	–	–	–	–	–
					B	95	28	15	–	–	–	–	–	–	–	–
6-9020	Grand River near Sumner	[a]6,880	1923-67	10	A	100	62	40	26	18	12	–	–	–	–	–
					B	100	43	20	10	–	–	–	–	–	–	–
6-9045	Chariton River at Novinger	[a]1,370	1931-67	0.1	A	20	6.3	1.8	0.4	0.1	–	–	–	–	–	–
					B	20	1.7	0.1	–	–	–	–	–	–	–	–
6-9055	Chariton River near Prairie Hill	[a]1,870	1929-67	4.6	A	35	16	11	8.0	6.5	5.6	–	–	–	–	–
					B	35	13	7.8	5.6	–	–	–	–	–	–	–
6-9184.2	Sac River at Ash Grove [b]	–	1962-67	8.5	A	15	10	6.5	–	–	–	–	–	–	–	–
					B	–	–	–	–	–	–	–	–	–	–	–
6-9184.3	Clear Creek near Phenix [b]	–	1962-65, 1967	2.1	A	6.0	4.0	2.5	1.7	–	–	–	–	–	–	–
					B	–	–	–	–	–	–	–	–	–	–	–
6-9184.5	Limestone Creek at South Greenfield [b]	–	1962-65, 1967	1.1	A	3.0	1.5	0.8	–	–	–	–	–	–	–	–
					B	–	–	–	–	–	–	–	–	–	–	–
6-9184.7	Turnback Creek near Greenfield [b]	252	1943, 1945-46, 1949, 1962-67	14	A	24	14	9.0	–	–	–	–	–	–	–	–
					B	–	–	–	–	–	–	–	–	–	–	–
6-9232	Niangua River near Buffalo [b]	–	1952, 1954, 1962-65, 1967	15	A	20	15	12	9.0	–	–	–	–	–	–	–
					B	–	–	–	–	–	–	–	–	–	–	–
6-9254.3	Wet Glaize Creek near Brumley [b]	–	1962-65 1967	11	A	20	17	14	12	10	–	–	–	–	–	–
					B	20	14	11	–	–	–	–	–	–	–	–
6-9254.4	Grandglaize Creek near Brumley [b]	–	1934-36	17	A	29	23	20	17	–	–	–	–	–	–	–
					B	29	19	15	–	–	–	–	–	–	–	–

6-9277	Gasconade River near Nebo [b]	–	1942, 1944-47, 1952, 1962-64, 1967	26	A	45	32	22	16	–	–	–	–	–	–	–
					B	45	23	13	–	–	–	–	–	–	–	–
6-9277.5	Osage Fork near Orla [b]	–	1953, 1962-65, 1967	17	A	34	26	19	15	11	–	–	–	–	–	–
					B	34	20	12	–	–	–	–	–	–	–	–
6-9278	Osage Fork at Drynob [b]	404	1942, 1944-47, 1952, 1953, 1956, 1962-67	12	A	38	28	20	15	11	–	–	–	–	–	–
					B	38	21	12	–	–	–	–	–	–	–	–
6-9280	Gasconade River near Hazelgreen	[a]1,250	1930-67	18	A	100	68	45	31	21	–	–	–	–	–	–
					B	100	46	23	–	–	–	–	–	–	–	–
6-9284.5	Roubidoux Creek at Waynesville [b]	–	1942-43, 1945-47, 1952, 1962-65, 1967	3.9	A	22	9.0	4.0	2.2	–	–	–	–	–	–	–
					B	–	–	–	–	–	–	–	–	–	–	–
6-9285	Gasconade River near Waynesville	[a]1,680	1915-67	44	A	200	120	82	60	48	–	–	–	–	–	–
					B	200	84	49	–	–	–	–	–	–	–	–
6-9289	Big Piney River near Houston [b]	–	1942-43, 1945-46, 1949,1952, 1962-65, 1967	20	A	30	22	18	16	14	–	–	–	–	–	–
					B	30	19	15	13	–	–	–	–	–	–	–
6-9300	Big Piney River near Big Piney	[a]560	1922-67	69	A	200	140	110	90	76	66	–	–	–	–	–
					B	200	110	78	62	–	–	–	–	–	–	–
6-9301	Spring Creek at Spring Creek [b]	–	1953, 1961-65, 1967	12	A	28	21	17	14	–	–	–	–	–	–	–
					B	28	18	12	–	–	–	–	–	–	–	–
6-9309	Little Piney Creek at Yancy Mills [b]	–	1953, 1962-65, 1967	0.2	A	12	3.0	0.8	0.2	–	–	–	–	–	–	–
					B	12	1.0	0.2	–	–	–	–	–	–	–	–
6-9317	Beaver Creek near Newburg [b]	–	1961-65, 1967	1.8	A	4.0	2.5	1.6	1.2	–	–	–	–	–	–	–
					B	4.0	1.8	1.1	–	–	–	–	–	–	–	–
6-9333	Mill Creek near Newburg [b]	–	1955-57, 1961-65, 1967	5.6	A	8.0	6.0	5.0	4.2	–	–	–	–	–	–	–
					B	8.0	5.0	4.0	–	–	–	–	–	–	–	–
6-9320	Little Piney Creek at Newburg	[a]200	1929-67	24	A	50	37	30	25	–	–	–	–	–	–	–
					B	50	31	23	–	–	–	–	–	–	–	–
6-9335	Gasconade River at Jerome	[a]2,840	1924-67	254	A	600	485	420	370	335	305	280	260	–	–	–
					B	600	415	325	275	255	–	–	–	–	–	–
6-9340	Gasconade River near Rich Fountain	[a]3,180	1923-59	275	A	650	550	480	425	380	345	315	290	270	–	–
					B	650	485	390	335	300	280	–	–	–	–	–
7-0104	Meramec River near St. James [b]	–	1953,1957, 1962-65, 1967	10	A	35	24	18	14	12	–	–	–	–	–	–
					B	35	19	13	10	–	–	–	–	–	–	–

RECESSION DATA (continued). . . . . .

A = Average Recession
B = Extreme Recession

STATION NUMBER	STATION NAME	DRAINAGE AREA (sq. mi.)	RECORD USED IN ANALYSIS	MINIMUM OBSERVED FLOW (cfs)		TIME, IN DAYS 0	10	20	30	40	50	60	70	80	90	100
7-0130	Meramec River near Steelville	781	1923-67	74	A	150	120	98	82	70	–	–	–	–	–	–
					B	150	105	84	71	–	–	–	–	–	–	–
7-0131	Huzzah Creek at Dillard [b]	[a]92	1943-45, 1961-65, 1967	8.4	A	18	13	9.5	7.2	–	–	–	–	–	–	–
					B	18	11	7.5	–	–	–	–	–	–	–	–
7-0140	Huzzah Creek near Steelville [b]	–	1942-43, 1946-47, 1951, 1961-65, 1967	26	A	50	36	28	22	18	–	–	–	–	–	–
					B	50	30	22	18	–	–	–	–	–	–	–
7-0142	Courtois Creek at Berryman [b]	173	1943-45, 1961-65, 1967	16	A	30	22	17	13	10	–	–	–	–	–	–
					B	30	18	13	11	–	–	–	–	–	–	–
7-0145	Meramec River near Sullivan	1,475	1922-67	131	A	300	240	200	170	150	130	–	–	–	–	–
					B	300	210	165	140	125	–	–	–	–	–	–
7-0157.5	Bourbeuse River near Owensville [b]	–	1943, 1946-48, 1962-65, 1967	.05	A	4.0	1.2	0.8	0.2	–	–	–	–	–	–	–
					B	4.0	0.9	0.1	–	–	–	–	–	–	–	–
7-0160	Bourbeuse River near Spring Bluff [b]	608	1962-65, 1967	1.2	A	20	8.5	4.0	1.6	0.9	–	–	–	–	–	–
					B	20	4.6	1.0	–	–	–	–	–	–	–	–
7-0165	Bourbeuse River at Union	808	1922-67	11	A	50	35	27	21	17	14	12	–	–	–	–
					B	50	28	18	13	11	–	–	–	–	–	–
7-0170	Meramec River at Robertsville [b]	2,673	1940-50	256	A	450	310	235	185	150	–	–	–	–	–	–
					B	450	240	155	–	–	–	–	–	–	–	–
7-0176	Big River near Bonne Terre [b]	–	1942-43, 1946-47, 1953, 1961-65, 1967	19	A	38	23	14	11	–	–	–	–	–	–	–
					B	38	13	–	–	–	–	–	–	–	–	–
7-0178	Mineral Fork near Potosi [b]	–	1961-65, 1967	20	A	27	16	11	7.5	–	–	–	–	–	–	–
					B	27	11	7.0	–	–	–	–	–	–	–	–
7-0180	Big River near DeSoto	718	1949-67	20	A	90	55	36	24	–	–	–	–	–	–	–
					B	90	37	22	–	–	–	–	–	–	–	–
7-0181	Big River near Richwoods [b]	–	1942-43, 1946-47, 1951, 1961-65	65	A	110	70	45	27	–	–	–	–	–	–	–
					B	110	38	–	–	–	–	–	–	–	–	–
7-0185	Big River at Byrnesville	917	1923-67	25	A	120	78	52	36	26	–	–	–	–	–	–
					B	120	47	26	–	–	–	–	–	–	–	–
7-0190	Meramec River near Eureka	3,788	1922-67	196	A	600	420	315	245	200	–	–	–	–	–	–
					B	600	320	205	–	–	–	–	–	–	–	–

7-0190.5	Joachim Creek at Hematite [b]	–	1961-65, 1967	1.9	A	2.5	0.9	0.4	0.2	–	–	–	–	–	–	–
					B	–	–	–	–	–	–	–	–	–	–	–
7-0206	Apple Creek at Appleton [b]	–	1942-44, 1946-47, 1961-65, 1967	5.6	A	14	10	7.5	5.5	–	–	–	–	–	–	–
					B	14	8.5	5.5	–	–	–	–	–	–	–	–
7-0210	Castor River at Zalma	423	1922-67	16	A	65	45	33	25	19	14	–	–	–	–	–
					B	65	38	25	18	14	–	–	–	–	–	–
7-0211.5	Crooked Creek at Lutesville [b]	–	1961-65, 1967	2.1	A	3.5	1.6	0.8	0.5	–	–	–	–	–	–	–
					B	3.5	1.1	0.5	–	–	–	–	–	–	–	–
7-0214	Whitewater River at Millersville [b]	–	1961-65, 1967	11	A	20	15	11	8.5	–	–	–	–	–	–	–
					B	20	12	8.5	–	–	–	–	–	–	–	–
7-0216	Whitewater River at Whitewater [b]	–	1921-26, 1961-65, 1967	16	A	30	19	13	9.0	6.5	–	–	–	–	–	–
					B	30	15	9.0	6.0	–	–	–	–	–	–	–
7-0218	Headwater Diversion Channel at Allenville [b]	982	1951-61, 1963-65, 1967	44	A	120	80	55	41	–	–	–	–	–	–	–
					B	120	65	40	–	–	–	–	–	–	–	–
7-0370	Big Creek at Des Arc [b]	99.6	1939, 1961-65, 1967	5.5	A	15	11	7.5	5.8	4.2	–	–	–	–	–	–
					B	15	8.5	5.5	4.0	–	–	–	–	–	–	–
7-0375	St. Francis River near Patterson	956	1922-67	8.0	A	70	42	27	18	12	8.0	–	–	–	–	–
					B	70	28	15	9.5	–	–	–	–	–	–	–
7-0380	Clark Creek at Patterson [b]	37.5	1939, 1961-65, 1967	1.9	A	4.5	2.8	1.8	1.2	–	–	–	–	–	–	–
					B	4.5	2.2	1.2	–	–	–	–	–	–	–	–
7-0409	Main ditch 2 near Malden [b]	15.2	1958-61, 1963-65, 1967	12	A	12	8.8	7.0	6.0	–	–	–	–	–	–	–
					B	12	6.5	4.5	–	–	–	–	–	–	–	–
7-0410	Little River Ditch 81 near Kennett	111	1927-67	8.0	A	60	38	25	17	12	9.0	–	–	–	–	–
					B	60	24	12	7.0	–	–	–	–	–	–	–
7-0410.5	Main ditch near Malden [b]	28.6	1958-61, 1963-65, 1967	4.3	A	7.5	5.2	4.0	3.3	2.7	–	–	–	–	–	–
					B	7.5	3.9	2.7	–	–	–	–	–	–	–	–
7-0411	Main ditch at Holcomb [b]	96.1	1958-61, 1963-65, 1967	19	A	19	11	7.5	5.9	–	–	–	–	–	–	–
					B	19	6.9	3.5	–	–	–	–	–	–	–	–
7-0420	Little River Ditch 1 near Kennett	235	1927-67	8.0	A	75	46	30	20	14	9.5	–	–	–	–	–
					B	75	26	13	7.0	–	–	–	–	–	–	–
7-0424	Main ditch 1 near Matthews [b]	62	1958-61, 1963-65, 1967	30	A	30	22	17	14	–	–	–	–	–	–	–
					B	30	15	10	–	–	–	–	–	–	–	–
7-0425	Little River Ditch 251 near Lilbourn	235	1946-67	29	A	70	54	44	38	32	–	–	–	–	–	–
					B	70	42	30	–	–	–	–	–	–	–	–
7-0465.2	Main ditch 1 near Deering [b]	66.4	1958-61, 1963-65, 1967	12	A	15	9.0	6.0	4.0	–	–	–	–	–	–	–
					B	15	5.9	3.1	–	–	–	–	–	–	–	–

RECESSION DATA (continued).....

A = Average Recession
B = Extreme Recession

STATION NUMBER	STATION NAME	DRAINAGE AREA (sq. mi.)	RECORD USED IN ANALYSIS	MINIMUM OBSERVED FLOW (cfs)		TIME, IN DAYS 0	10	20	30	40	50	60	70	80	90	100
7-0465.5	Buffalo ditch near Arbyrd [b]	38.7	1958-61, 1963-65, 1967	6.9	A	15	8.8	5.5	3.5	–	–	–	–	–	–	–
					B	15	5.3	2.2	–	–	–	–	–	–	–	–
7-0515	James River below Battlefield [b]	328	1929-32	13	A	23	13	7.8	4.5	–	–	–	–	–	–	–
					B	23	9.0	3.8	–	–	–	–	–	–	–	–
7-0523	Finley Creek near Ozark [b]	–	1943, 1946-47, 1952, 1962-67	9.4	A	22	12	6.4	–	–	–	–	–	–	–	–
					B	–	–	–	–	–	–	–	–	–	–	–
7-0525	James River at Galena	987	1922-67	10	A	130	78	48	29	18	11	–	–	–	–	–
					B	130	56	25	11	–	–	–	–	–	–	–
7-0527.5	Flat Creek at Cassville [b]	–	1944-46, 1949, 1952, 1956, 1962-67	1.9	A	4.5	3.2	2.4	1.8	1.4	–	–	–	–	–	–
					B	4.5	2.1	1.2	–	–	–	–	–	–	–	–
7-0528	Flat Creek at Jenkins [b]	–	1942, 1962-67	16	A	30	22	17	14	11	–	–	–	–	–	–
					B	30	15	9.0	–	–	–	–	–	–	–	–
7-0538	Bull Creek at Walnut Shade [b]	–	1943, 1945-47, 1949, 1952, 1954, 1962-67	0	A	5.0	2.0	0.8	0.3	–	–	–	–	–	–	–
					B	5.0	1.1	0.2	–	–	–	–	–	–	–	–
7-0539.8	Swan Creek at Forsyth [b]	–	1923, 1930-32, 1938, 1941, 1962-67	2.8	A	9.0	3.4	1.3	–	–	–	–	–	–	–	–
					B	–	–	–	–	–	–	–	–	–	–	–
7-0540.4	Beaver Creek near Bradleyville [b]	–	1964-67	14.0	A	22	16	12	10	–	–	–	–	–	–	–
					B	22	13	8.5	–	–	–	–	–	–	–	–
7-0540.5	Little Beaver Creek near Bradleyville [b]	–	1964-67	4.4	A	6.0	3.6	2.2	–	–	–	–	–	–	–	–
					B	–	–	–	–	–	–	–	–	–	–	–
7-0541.5	Beaver Creek at Kissee Mills [b]	–	1943, 1945-46, 1949, 1952, 1962-67	30	A	48	29	18	11	–	–	–	–	–	–	–
					B	48	21	9.5	–	–	–	–	–	–	–	–
7-0574	North Fork River at Twin Bridges [b]	–	1962-67	30	A	42	37	33	30	27	–	–	–	–	–	–
					B	42	31	25	21	18	–	–	–	–	–	–
7-0574.5	Spring Creek at Twin Bridges [b]	–	1962-67	18	A	24	21	20	19	17	–	–	–	–	–	–
					B	24	19	17	15	14	–	–	–	–	–	–
7-0575	North Fork River near Tecumseh	561	1945-67	187	A	500	395	330	280	255	235	220	210	200	190	–
					B	500	345	265	225	200	185	–	–	–	–	–

7-0577	Bryant Creek near Evans [b]	–	1964-67	23	A	66	46	34	26	22	–	–	–	–	–	–
					B	66	31	18	14	–	–	–	–	–	–	–
7-0580	Bryant Creek near Tecumseh	570	1945-67	96	A	250	195	160	135	120	105	95	–	–	–	–
					B	250	150	105	90	–	–	–	–	–	–	–
7-0589	Bennett Bayou at Bakersfield [b]	–	1964-67	3.2	A	40	16	8.0	4.2	2.8	–	–	–	–	–	–
					B	40	6.2	1.8	–	–	–	–	–	–	–	–
7-0611.5	West Fork Black River at Centerville [b, d]	–	1942-43, 1945-47, 1952, 1960-67	14	A	35	26	21	17	13	–	–	–	–	–	–
					B	35	23	16	12	–	–	–	–	–	–	–
7-0611.7	Middle Fork Black River near Lesterville [b, d]	–	1960-67	7.8	A	28	21	16	11	7.4	–	–	–	–	–	–
					B	28	17	10	7.0	–	–	–	–	–	–	–
7-0615	Black River near Annapolis	484	1940-67	65	A	130	108	90	76	64	–	–	–	–	–	–
					B	130	95	74	62	–	–	–	–	–	–	–
7-0621	McKenzie Creek near Piedmont [b]	–	1960-67	1.9	A	4.2	3.3	2.6	2.0	1.6	–	–	–	–	–	–
					B	4.2	2.8	1.9	1.5	–	–	–	–	–	–	–
7-0635	Cane Creek at Harviell [b]	188	1939-42, 1958-61, 1963-64	9.9	A	15	11	8.5	6.6	–	–	–	–	–	–	–
					B	15	8.5	6.0	–	–	–	–	–	–	–	–
7-0648	Sinking Creek near Round Spring [b]	–	1942-43, 1945-47, 1952, 1956, 1962-67	27	A	38	34	32	29	27	–	–	–	–	–	–
					B	38	30	26	23	–	–	–	–	–	–	–
7-0649.5	Current River at Round Spring [b]	–	1942-43, 1945-47, 1956, 1962-67	222	A	340	290	275	255	240	–	–	–	–	–	–
					B	340	260	220	200	190	–	–	–	–	–	–
7-0652	Jacks Fork near Mountain View [b]	–	1942-43, 1945-46, 1952, 1962-67	14	A	22	19	15	13	11	–	–	–	–	–	–
					B	22	16	12	10	–	–	–	–	–	–	–
7-0660	Jacks Fork at Eminence	398	1922-67	64	A	130	112	98	85	75	66	–	–	–	–	–
					B	130	89	74	65	–	–	–	–	–	–	–
7-0665	Current River near Eminence	1,272	1922-67	324	A	700	600	530	475	435	405	385	365	350	340	330
					B	700	480	385	340	320	300	–	–	–	–	–
7-0670	Current River at Van Buren	1,667	1922-67	473	A	900	800	710	650	600	570	540	520	495	475	–
					B	900	650	540	490	460	–	–	–	–	–	–
7-0680	Current River at Doniphan	2,038	1922-67	852	A	1,800	1,600	1,450	1,320	1,220	1,140	1,060	990	930	880	840
					B	1,800	1,420	1,180	1,030	920	850	–	–	–	–	–
7-0685	Little Black River near Fairdealing [b]	187	1939-42, 1962-67	23	A	26	22	18	16	14	–	–	–	–	–	–
					B	26	18	14	12	–	–	–	–	–	–	–
7-0705	Eleven Point River near Thomasville	361	1951-67	2.7	A	10	7.0	5.0	3.7	2.8	–	–	–	–	–	–
					B	10	5.2	3.4	2.6	–	–	–	–	–	–	–
7-0715	Eleven Point River near Bardley	793	1922-67	152	A	400	335	290	255	230	210	195	180	165	155	–
					B	400	280	220	185	165	155	–	–	–	–	–

RECESSION DATA (continued).....

A = Average Recession
B = Extreme Recession

STATION NUMBER	STATION NAME	DRAINAGE AREA (sq. mi.)	RECORD USED IN ANALYSIS	MINIMUM OBSERVED FLOW (cfs)		TIME, IN DAYS 0	10	20	30	40	50	60	70	80	90	100
7-1854	Williams Creek near Mt. Vernon [b]	–	1954, 1962-65, 1967	0.5	A	5.8	4.8	3.6	2.6	–	–	–	–	–	–	–
					B	5.8	3.1	1.0	–	–	–	–	–	–	–	–
7-1856.5	Spring River near Stotts City [b]	–	1943-44, 1946-47, 1949, 1954, 1962-65, 1967	10.5	A	50	35	24	16	11	–	–	–	–	–	–
					B	50	25	15	9.6	–	–	–	–	–	–	–
7-1857	Spring River at Larussell	306	1957-67	15	A	52	36	25	16	10	–	–	–	–	–	–
					B	52	26	15	9.0	–	–	–	–	–	–	–
7-1860	Spring River near Waco	1,164	1925-67	4.2	A	70	42	24	13	6.8	–	–	–	–	–	–
					B	70	26	11	5.2	–	–	–	–	–	–	–
7-1861	Center Creek near Sarcoxie [b]	–	1954, 1962-65, 1967	9.0	A	20	13	8.4	5.0	–	–	–	–	–	–	–
					B	20	9.0	4.2	–	–	–	–	–	–	–	–
7-1862	Center Creek near Fidelity [b]	–	1962-65, 1967	12	A	30	18	10	6.0	–	–	–	–	–	–	–
					B	30	11	5.0	–	–	–	–	–	–	–	–
7-1864	Center Creek near Carterville [e]	232	1962-67	16	A	–	–	–	–	–	–	–	–	–	–	–
					B	–	–	–	–	–	–	–	–	–	–	–
7-1864.2	Center Creek near Webb City [e]	–	1962-64, 1966	20	A	–	–	–	–	–	–	–	–	–	–	–
					B	–	–	–	–	–	–	–	–	–	–	–
7-1864.6	Center Creek near Carl Junction [e]	–	1943,1946, 1949, 1952, 1954, 1956, 1962-67	14	A	–	–	–	–	–	–	–	–	–	–	–
					B	–	–	–	–	–	–	–	–	–	–	–
7-1867	Shoal Creek near Fairview [b]	–	1954, 1962-67	5.8	A	18	14	11	9.0	7.6	–	–	–	–	–	–
					B	18	9.8	6.5	5.2	–	–	–	–	–	–	–
7-1868	Capps Creek near Berwick [b]	–	1962-67	13	A	22	18	15	13	11	–	–	–	–	–	–
					B	22	14	9.0	–	–	–	–	–	–	–	–
7-1868.5	Clear Creek near Ritchey [b]	–	1954, 1962-67	4.3	A	8.0	6.4	4.8	3.8	3.0	–	–	–	–	–	–
					B	8.0	4.2	2.3	–	–	–	–	–	–	–	–
7-1868.8	Shoal Creek at Ritchey [b]	–	1954, 1962-67	32	A	60	45	34	27	22	–	–	–	–	–	–
					B	60	31	18	–	–	–	–	–	–	–	–
7-1868.9	Shoal Creek at Neosho [b]	–	1941-43, 1945-46, 1949, 1952, 1954, 1962-65, 1967	13	A	66	49	38	30	24	–	–	–	–	–	–
					B	66	33	20	15	12	–	–	–	–	–	–

7-1869	Hickory Creek at Neosho [b]	–	1941, 1962-65, 1967	3.7	A	11	8.2	6.4	4.7	3.5	–	–	–	–	–	–
					B	11	5.4	2.6	–	–	–	–	–	–	–	–
7-1870	Shoal Creek above Joplin	410	1942-67	12	A	100	76	58	46	37	30	24	20	16	13	–
					B	100	51	30	20	14	–	–	–	–	–	–
7-1888.5	Elk River at Pineville [b]	–	1942, 1945, 1947, 1949, 1952, 1962-65, 1967	10	A	40	23	13	8.0	5.0	–	–	–	–	–	–
					B	40	13	5.0	–	–	–	–	–	–	–	–
7-1888.7	Indian Creek at Anderson [b]	–	1942, 1945, 1947, 1949, 1952, 1962-65, 1967	21	A	42	29	21	16	12	–	–	–	–	–	–
					B	42	18	9.5	–	–	–	–	–	–	–	–
7-1890	Elk River near Tiff City	872	1940-67	5.1	A	100	61	40	26	18	12	8.4	5.9	–	–	–
					B	100	40	18	8.4	4.5	–	–	–	–	–	–

a Approximately.

b Data estimated from regression on long-time continuous record.

c Short-time continuous-record station.

d Low-flow now augmented by pumpage from mines. Data represents unregulated conditions and is therefore a conservative estimate.

e Base-flow recessions affected by industrial effluent. Effect on slope of recession line is uncertain.

APPENDIX 2

MAGNITUDE AND FREQUENCY OF SEASONAL LOW FLOWS

This appendix presents seasonal low-flow frequency determinations for continuous-record and partial-record gaging stations where sufficient streamflow information was available for statistical studies.

Station Number is a nationwide identification number used by the U.S. Geological Survey. It locates the station in relation to drainage basin and downstream direction along the main stream.

Station name and location presents the name of the streamgaging station and a reference to a nearby town. Exact station locations are shown on maps in Water Resources Reports 20 and 22. If further information concerning station locations is required, contact the District Chief, Water Resources Division, P.O. Box 340, Rolla, Mo. 65401.

Record used in analysis shows the years from which frequency estimates were computed for the continuous-record stations. For partial-record stations, the water years (October 1 to September 30) in which the stations were measured are shown.

Drainage area is the most recent determination of this parameter and is based on the most accurate maps available. Drainage areas have not been determined for most partial-record stations; however, all partial-record stations listed have drainage areas greater than 20 square miles.

For continuous-record stations, seasonal low-flow frequency data are presented for 1, 7, 14, and 30-day periods and for recurrence intervals of 2, 5, 10, 20, 30 and 50 years where station data were sufficient to warrant such estimates. If data were too scant or unreliable to make complete frequency estimates, appropriate time periods and recurrence intervals were omitted.

For partial-record stations, only the 7-day, 2-year, and 10-year recurrence intervals are presented.

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
	UPPER MISSISSIPPI RIVER BASIN									
5-4950	Fox River at Wayland	1922-66	[a]400	1	2.0	0.3	0.1	0	0	0
				7	2.8	0.5	0.1	0	0	0
				14	3.7	0.9	0.2	0	0	0
				30	9.2	2.1	0.6	0.2	0.1	0
5-4958	North Wyaconda River near Granger	1962-64	–	7	0	–	0	–	–	–
5-4960	Wyaconda River above Canton	1933-64	393	1	1.6	0.1	0	0	0	0
				7	2.2	0.2	0	0	0	0
				14	3.9	0.5	0.1	0	0	0
				30	9.4	1.0	0.2	0	0	0

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
5-4969.5	North Fabius River at Memphis	1942-43, 1945-48, 1953, 1962-64	–	7	1.9	–	0.1	–	–	–
5-4970	North Fabius River at Monticello	1922-63	452	1	3.5	0.6	0	0	0	0
				7	4.9	1.1	0.1	0	0	0
				14	7.2	1.6	0.2	0	0	0
				30	15	2.9	0.3	0	0	0
5-4975	Middle Fabius River near Baring [b]	1936-60	185	1	0.2	0	0	0	0	0
				7	0.3	0	0	0	0	0
				14	0.5	0	0	0	0	0
				30	0.8	0.1	0	0	0	0
5-4980	Middle Fabius River near Monticello	1946-60	393	1	3.0	0.4	0	0	–	–
				7	4.0	0.9	0.3	0.1	–	–
				14	6.2	1.5	0.6	0.2	–	–
				30	10	2.2	1.0	0.5	–	–
5-4985	North Fabius River at Taylor [c]	1931-40, 1967	930	7	17	–	(d)			
5-5000	South Fabius River near Taylor	1935-60	620	1	5.0	0.5	0	0	0	0
				7	7.0	1.1	0.1	0	0	0
				14	10	2.0	0.2	0	0	0
				30	22	4.2	0.6	0	0	0
5-5005	North River at Bethel	1937-63	[a]58	1	0.1	0	0	0	0	0
				7	0.1	0	0	0	0	0
				14	0.2	0	0	0	0	0
				30	1.0	0.2	0.1	0	0	0
5-5010	North River at Palmyra	1935-66	373	1	2.7	0.5	0.1	0	0	0
				7	3.8	0.7	0.2	0	0	0
				14	5.5	1.1	0.3	0	0	0
				30	15	2.7	0.7	0.1	0	0
5-5020	Bear Creek at Hannibal	1939-42 1948-66	31.0	1	0.2	0	0	0	0	0
				7	0.4	0	0	0	0	0
				14	0.6	0	0	0	0	0
				30	1.0	0.1	0	0	0	0
5-5022	Salt River near Novelty	1962-65	–	7	0.5	–	0.1	–	–	–
5-5025	Salt River near Shelbina	1934-63	481	1	1.2	0.1	0	0	0	0
				7	2.1	0.2	0	0	0	0
				14	3.2	0.3	0	0	0	0
				30	11	0.9	0.1	0	0	0
5-5029	Black Creek at Shelbyville [e]	1942-43, 1945-47, 1953, 1962-64	–	7	0.1	–	0	–	–	–
5-5044	South Fork Salt River at Mexico [e]	1933-34, 1962-65, 1967	–	7	0.8	–	0.4	–	–	–
5-5050	South Fork Salt River at Santa Fe	1940-63	298	1	0.6	0.1	0	0	0	–
				7	1.0	0.2	0.1	0	0	–
				14	1.6	0.5	0.2	0.1	0.1	–
				30	4.2	1.2	0.6	0.3	0.2	–

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
5-5060	Youngs Creek near Mexico	1937-63	67.4	1	0	0	0	0	0	0
				7	0	0	0	0	0	0
				14	0	0	0	0	0	0
				30	0.2	0	0	0	0	0
5-5065	Middle Fork Salt River at Paris	1940-63	356	1	1.9	0.3	0	0	0	0
				7	2.6	0.5	0.1	0	0	0
				14	4.1	1.2	0.4	0.1	0	0
				30	10	2.5	0.7	0.2	0.1	0
5-5070	Elk Fork Salt River near Paris [b]	1935-54	356	1	0.6	0.1	0	0	0	0
				7	0.9	0.2	0	0	0	0
				14	1.4	0.3	0.1	0	0	0
				30	3.9	0.7	0.2	0.1	0	0
5-5075	Salt River near Monroe City	1940-63	[a]2,230	1	16	6.0	2.0	0.3	0	—
				7	22	8.1	3.0	0.6	0.1	—
				14	32	12	4.5	1.1	0.3	—
				30	90	20	7.5	2.1	0.7	—
5-5080	Salt River near New London	1923-63	[a]2,480	1	26	8.5	2.3	0.3	0	0
				7	33	12	3.5	0.6	0.1	0
				14	52	20	6.8	1.2	0.3	0
				30	130	37	13	2.7	0.8	0.1
5-5088	Spencer Creek near Frankford	1930-36, 1962-65	—	7	1.0	—	0	—	—	—
5-5143	North Fork Cuivre River at Silex	1962-65	—	7	1.1	—	0.1	—	—	—
5-5144.5	West Fork Cuivre River near Troy	1962-65	—	7	2.3	—	0.2	—	—	—
5-5145	Cuivre River near Troy	1922-63	903	1	7.5	2.0	0.8	0.3	0.1	0
				7	9.2	2.5	1.0	0.4	0.2	0.1
				14	15	4.4	1.8	0.7	0.3	0.1
				30	34	8.8	3.4	1.2	0.6	0.2
5-5146	Big Creek near Moscow Mills [e]	1962-64, 1967	—	7	0.4	—	0.1	—	—	—
5-5147.1	Peruque Creek near Wentzville [e]	1942-43, 1946, 1948, 1953, 1962-63	—	7	0.2	—	0	—	—	—
5-5147.2	Dardenne Creek near Weldon Spring [e]	1942-43, 1946,1948, 1953, 1961-63, 1967	—	7	0.2	—	0	—	—	—
	MISSOURI RIVER BASIN									
6-8125	West Tarkio Creek near Westboro [b]	1934-39	105	7	1.4	—	0.2	—	—	—
6-8130	Tarkio River at Fairfax	1922-65	508	1	13	2.2	0.7	0.2	0.1	0
				7	19	4.0	1.5	0.5	0.3	0.1
				14	32	7.6	3.1	1.2	0.7	0.3
				30	45	13	5.4	2.4	1.5	0.8
6-8155.7	Little Tarkio Creek near Mound City	1962-65, 1967	—	7	3.9	—	(d)	—	—	—

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
6-8175	Nodaway River at Burlington Junction	1922-65	[a]1,240	1	32	12	6.2	3.0	2.0	1.1
				7	43	17	9.2	4.6	3.0	1.7
				14	60	24	14	6.8	4.4	2.5
				30	92	35	20	11	7.1	4.1
6-8178	Nodaway River near Oregon	1942-43, 1946, 1962-65, 1967	–	7	58	–	10	–	–	–
6-8189	Platte River at Ravenwood	1958-67	486	7	5.0	–	(d)	–	–	–
6-8190.1	Long Creek near Guilford [e]	1942-43, 1946, 1962-64	–	7	0	–	0	–	–	–
6-8190.2	Platte River at Whitesville	1964-65, 1967	–	7	17	–	(d)	–	–	–
6-8190.9	Platte River near St. Joseph	1962-65, 1967	–	7	14	–	(d)	–	–	–
6-8195	102 River near Maryville	1933-65	[a]500	1	4.0	0.8	0.2	0	0	0
				7	5.2	1.2	0.4	0.2	0.1	0
				14	7.8	2.1	0.8	0.3	0.2	0.1
				30	14	4.0	1.6	0.6	0.4	0.2
6-8204	White Cloud Creek near Bernard [e]	1942-43, 1946, 1962-64	–	7	0.2	–	0	–	–	–
6-8204.2	102 River at Rosendale	1964-65, 1967	–	7	6.2	–	(d)	–	–	–
6-8204.6	102 River at Avenue City	1942-43, 1946, 1962-65, 1967	–	7	11	–	(d)	–	–	–
6-8204.8	102 River near St. Joseph	1962-65, 1967	–	7	17	–	(d)	–	–	–
6-8205	Platte River near Agency	1933-66	[a]1,760	1	34	7.8	2.0	0.4	0.2	0
				7	44	10	2.6	0.6	0.2	0.1
				14	60	16	4.9	1.3	0.5	0.2
				30	105	25	8.2	2.6	1.3	0.5
6-8209	Castile Creek near Gower	1942-43, 1946, 1962-65, 1967	–	7	0.3	–	0	–	–	–
6-8210.5	Castile Creek near Edgerton	1962-64, 1967	–	7	1.3	–	0	–	–	–
6-8211	Little Platte River near Trimble [e]	1962-64	–	7	0	–	0	–	–	–
6-8212	Platte River at Platte City	1962-65, 1967	–	7	80	–	(d)	–	–	–
6-8934.5	Blue River at Kansas City	1962-64	–	7	0.1	–	0	–	–	–
6-8937	Shoal Creek near Liberty	1962, 1964, 1967	–	7	1.4	–	0	–	–	–

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
6-8938	Little Blue River at Kansas City	1962,1964, 1967	–	7	2.3	–	(d)	–	–	–
6-8939	Little Blue River near Blue Springs	1962,1964, 1967	–	7	3.3	–	(d)	–	–	–
6-8940	Little Blue River near Lake City	1948-65	184	1	4.7	0.3	0	0	0	0
				7	6.0	0.5	0	0	0	0
				14	8.0	0.9	0.1	0	0	0
				30	20	2.3	0.2	0	0	0
6-8943	Fishing River at Mosby	1962-65, 1967	–	7	1.6	–	0.2	–	–	–
6-8944	Williams Creek near Mosby [e]	1962-64	–	7	0.1	–	0			
6-8945	East Fork Fishing River at Excelsior Springs	1951-65	20.0	1	0.6	0	0	0	0	0
				7	0.8	0.1	0	0	0	0
				14	1.1	0.2	0	0	0	0
				30	2.0	0.3	0.1	0	0	0
6-8946	Fishing River near Orrick	1962-65	–	7	6.0	–	0.8	–	–	–
6-8947	Sni-A-Bar Creek at Grain Valley	1962, 1964-65, 1967	–	7	0.6	–	0	–	–	–
6-8948	Sni-A-Bar Creek near Wellington	1962, 1964-65, 1967	–	7	2.2	–	0.1	–	–	–
6-8950	Crooked River near Richmond	1948-65	159	1	0.8	0.1	0	0	0	0
				7	1.2	0.2	0.1	0	0	0
				14	2.1	0.4	0.1	0.1	0	0
				30	6.0	1.2	0.5	0.2	0.1	0
6-8950.5	West Fork Crooked River at Richmond [e]	1943, 1945-46, 1953,1962	–	7	0	–	0	–	–	–
6-8960	Wakenda Creek at Carrollton	1948-65	248	1	2.0	0.8	0.5	0.3	–	–
				7	2.4	1.0	0.6	0.3	–	–
				14	3.1	1.2	0.7	0.4	–	–
				30	6.8	2.2	1.2	0.7	–	–
6-8961.6	Grand River near Grant City	1962-65, 1967	–	7	3.5	–	[f]0-1	–	–	–
6-8961.7	Grand River near Stanberry	1943, 1946-47, 1953, 1962-65, 1967	–	7	6.8	–	1.9	–	–	–
6-8961.85	Middle Fork Grand River at Grant City	1943,1946, 1962-65, 1967	–	7	0.3	–	0	–	–	–
6-8961.9	Middle Fork Grand River near Albany	1943,1946, 1953, 1962-65, 1967	–	7	3.5	–	0.9	–	–	–
6-8964	East Fork Grand River at Albany	1943,1946, 1953, 1962-65, 1967	–	7	6.0	–	0.8	–	–	–

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
6-8965.5	Grand River near Darlington	1929-31, 1962-65, 1967	–	7	17	–	4.4	–	–	–
6-8967.5	West Fork Lost Creek at Maysville [e]	1943, 1945-46, 1962-64	–	7	0.1	–	0	–	–	–
6-8968	Lost Creek near Weatherby [e]	1943, 1945-47, 1962-64	–	7	0.3	–	0	–	–	–
6-8968.5	Grindstone Creek near Pattonsburg [e]	1962-64	–	7	2.6	0.1	–	–	–	–
6-8969	Grand River near Pattonsburg	1958, 1960-65, 1967	–	7	30	–	4.7	–	–	–
6-8970	East Fork Big Creek near Bethany	1934-65	[a]95	1	0	0	0	0	0	0
				7	0.2	0	0	0	0	0
				14	1.2	0	0	0	0	0
				30	8.5	0	0	0	0	0
6-8971	Big Creek at Bethany [e]	1934,1943, 1946,1953, 1962-65	–	7	2.8	–	0.1	–	–	–
6-8973	Big Creek near Pattonsburg	1964-65, 1967	–	7	3.1	-	(d)	–	–	–
6-8975	Grand River near Gallatin	1921-65	[a]2,250	1	42	13	6.8	4.1	3.2	2.3
				7	50	17	9.2	5.8	4.5	3.3
				14	68	22	12	7.4	5.8	4.3
				30	110	39	21	12	9.2	6.6
6-8981	Thompson River near Mt. Moriah [g]	1960-67	891	7	25	–	(d)	–	–	–
6-8982	Thompson River near Trenton	1961-64, 1967	–	7	32	–	(d)	–	–	–
6-8985	Weldon River near Mercer [b]	1940-59	246	1	0.6	0	0	0	0	0
				7	0.9	0	0	0	0	0
				14	1.5	0.1	0	0	0	0
				30	3.8	0.5	0	0	0	0
6-8990	Weldon River at Mill Grove	1930-65	494	1	4.3	0.6	0.1	0	0	0
				7	6.2	1.2	0.2	0	0	0
				14	8.2	1.9	0.4	0.1	0	0
				30	13	3.4	1.0	0.3	0.1	0
6-8991	Weldon River near Trenton	1961-65, 1967	–	7	14	–	(d)	–	–	–
6-8995	Thompson River at Trenton	1929-65	[a]1,670	1	42	14	5.9	2.3	1.2	0.4
				7	52	17	8.0	3.4	1.9	0.8
				14	64	22	11	4.6	2.7	1.2
				30	94	33	16	7.6	4.6	2.2
6-8995.5	Muddy Creek at Trenton	1962-65, 1967	–	7	1.2	–	0.2	–	–	–
6-8995.7	Honey Creek near Trenton	1962-65, 1967	–	7	0.3	–	0	–	–	–

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
6-8996.8	Grand River at Chillicothe	1934,1936, 1957-58, 1961-65, 1967	–	7	180	–	40	–	–	–
6-8996.9	Shoal Creek at Kingston	1942-43, 1945-46, 1962-64, 1967	–	7	1.1	–	0	–	–	–
6-8997	Shoal Creek near Braymer	1958-67	–	7	2.6	–	0	–	–	–
6-8998	Shoal Creek near Chillicothe	1942-43, 1945-46, 1962-65, 1967	–	7	4.4	–	[f]0-1	–	–	–
6-9000	Medicine Creek near Galt	1922-65	225	1	3.0	0.9	0.3	0.1	0	0
				7	4.2	1.4	0.5	0.1	0	0
				14	5.4	1.9	0.7	0.2	0.1	0
				30	9.1	3.4	1.4	0.5	0.2	0
6-9005	Medicine Creek near Sturges [e]	1930-33, 1962-65, 1967	368	7	7.0	–	1.2	–	–	–
6-9006	Medicine Creek near Wheeling	1942-43, 1945-47, 1962-65, 1967	–	7	9.4	–	2.0	–	–	–
6-9007	Parson Creek at Meadville [e]	1942-43, 1945-47, 1962-64	–	7	0	–	0	–	–	–
6-9010	Locust Creek near Milan [b]	1922-32	[a]225	7	3.2	–	0.5	–	–	–
6-9015	Locust Creek near Linneus	1929-65	[a]550	1	5.0	1.9	0.8	0.3	0.1	0
				7	6.1	2.5	1.2	0.4	0.2	0
				14	8.1	3.2	1.6	0.6	0.2	0
				30	16	5.4	2.4	0.8	0.4	0.1
6-9020	Grand River near Sumner	1925-65	[a]6,880	1	200	77	40	21	14	9.0
				7	240	93	48	25	18	11
				14	300	120	62	33	23	15
				30	485	180	93	50	35	22
6-9022	West Yellow Creek near Brookfield [g]	1960-66	135	7	0.1	–	0	–	–	–
6-9023	West Yellow Creek below Brookfield [e]	1942-43, 1945-47, 1953, 1962-64	–	7	0.1	–	0	–	–	–
6-9029	East Yellow Creek near Brookfield [e]	1942-43, 1945-47, 1953, 1962-64	–	7	0	–	0	–	–	–
6-9030	Yellow Creek near Rothville [b]	1929-31, 1949-50	405	7	1.0	–	0.1	–	–	–

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
6-9031	Turkey Creek near Laclede [e]	1942-43, 1945-47, 1953, 1962-64	–	7	0	–	0	–	–	–
6-9032	Big Creek near Bosworth [e]	1962-64	–	7	0.2	–	0	–	–	–
6-9043	Shoal Creek near Hartford	1963-66	–	7	0.1	–	0	–	–	–
6-9044	Blackbird Creek near Unionville [e]	1942-43, 1945-48, 1962-64	–	7	0	–	0	–	–	–
6-9045	Chariton River at Novinger	1931-65	[a]1,370	1	14	4.4	1.9	0.8	0.4	0.2
				7	17	6.0	2.8	1.3	0.8	0.4
				14	23	7.4	3.6	1.8	1.2	0.7
				30	37	12	5.8	2.9	1.9	1.2
6-9055	Chariton River near Prairie Hill	1930-65	[a]1,870	1	39	17	10	6.0	4.4	3.1
				7	46	20	12	6.9	5.2	3.6
				14	60	25	15	8.9	6.6	4.6
				30	98	38	22	13	9.8	6.8
6-9061	Mussel Fork at Keytesville [e]	1942-43, 1946, 1953, 1962-65	–	7	1.6	–	0.1	–	–	–
6-9063	E. Fk. Chariton R. near Huntsville [g]	1962-67	–	7	0.4	–	0	–	–	–
6-9067	Flat Creek near Sedalia [b]	1960-66	148	7	0.1	–	0	–	–	–
6-9070	Lamine River at Clifton City	1923-65	598	1	3.9	1.2	0.4	0.1	0	0
				7	5.6	1.8	0.6	0.2	0.1	0
				14	7.8	2.6	1.0	0.3	0.1	0
				30	20	5.9	2.4	0.8	0.3	0.1
6-9071	Muddy Creek near Sedalia	1962, 1964-65, 1967	–	7	2.7	–	(d)	–	–	–
6-9075.5	Blackwater River near Warrensburg [e]	1942-43, 1946, 1952-53, 1962-64	–	7	0.3	–	0	–	–	–
6-9076	Post Oak Creek at Warrensburg [e]	1942-43, 1946, 1953, 1962-64	–	7	0.1	–	0	–	–	–
6-9077	Blackwater River at Valley City [g]	1959-66	547	7	2.4	–	0.4	–	–	–
6-9078	Davis Creek at Sweet Springs [e]	1942-43, 1945-46, 1953, 1962-64	–	7	0.6	–	0.1	–	–	–
6-9079	Blackwater River at Sweet Springs	1942-43, 1946, 1952-53, 1962-65, 1967	–	7	3.0	–	(d)	–	–	–

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
6-9080	Blackwater River at Blue Lick	1938-65	[a]1,120	1	2.0	0.8	0.4	0.2	0.2	–
				7	4.5	1.4	0.8	0.4	0.3	–
				14	8.2	2.4	1.2	0.7	0.5	–
				30	36	9.7	4.7	2.5	1.7	–
6-9092.5	Bonne Femme Creek at Fayette [e]	1942-43, 1946, 1953, 1962-64	–	7	0.2	–	0	–	–	–
6-9095	Moniteau Creek near Fayette	1948-65	[a]81	1	0	0	0	0	0	0
				7	0	0	0	0	0	0
				14	0.1	0	0	0	0	0
				30	0.5	0.1	0	0	0	0
6-9100	Petite Saline Creek near Boonville	1948-65	182	1	0.4	0	0	0	–	–
				7	0.7	0.1	0	0	–	–
				14	1.1	0.2	0.1	0	–	–
				30	5.7	0.9	0.3	0.2	–	–
6-9102.2	Perche Creek near Columbia	1962-65, 1967	–	7	0.7	–	0.2	–	–	–
6-9102.3	Hinkson Creek at Columbia [g]	1942-43, 1946, 1952-53, 1962-64, 1967	70.2	7	0.2	–	0	–	–	–
6-9104.15	Cedar Creek near Cedar City [e]	1962-65	–	7	0.4	–	0	–	–	–
6-9104.2	North Moreau Creek near California	1962-65, 1967	–	7	0.7	–	0.1	–	–	–
6-9105	Moreau River near Jefferson City	1948-65	531	1	4.2	1.2	0.6	0.3	–	–
				7	6.5	1.6	0.8	0.4	–	–
				14	10	2.7	1.4	0.7	–	–
				30	21	5.0	2.7	1.5	–	–
6-9166.5	Osage River near Rich Hill	1962-65, 1967	–	7	20	–	[f]0-1	–	–	–
6-9166.7	Miami Creek near Butler [e]	1943,1945, 1947,1949, 1954-55, 1962-64	–	7	0.2	–	0	–	–	–
6-9170.3	Little Osage River at Stotesbury [b, e]	1929-32, 1960, 1962-64, 1967	427	7	0.6	–	0	–	–	–
6-9170.6	Little Osage River at Horton	1960-65, 1967	–	7	0.7	–	0	–	–	–
6-9180.6	Marmaton River near Nevada	1962-65, 1967	–	7	6.5	–	[f]0-1	–	–	–
6-9180.8	Osage River near Schell City	1932-35, 1960-65, 1967	–	7	27	–	[f]0-1	–	–	–
6-9183.2	Clear Creek near Eldorado Springs [e]	1943, 1945, 1946-47, 1949, 1952, 1962-63	–	7	0.2	–	0	–	–	–

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
6-9184.2	Sac River at Ash Grove	1962-67	–	7	28	–	6.2	–	–	–
6-9184.3	Clear Creek near Phenix	1962-65, 1967	–	7	8.2	–	2.6	–	–	–
6-9184.5	Limestone Creek at South Greenfield	1962-65, 1967	–	7	4.6	–	1.0	–	–	–
6-9184.7	Turnback Creek near Greenfield[e]	1943, 1945-46, 1949, 1962-66	–	7	32	–	10	–	–	–
6-9184.8	Sac River near Neola	1964-65, 1967	–	7	64	–	23	–	–	–
6-9188	Little Sac River at Aldrich	1962-65, 1967	304	7	5.0	–	(d)	–	–	–
6-9195	Cedar Creek near Pleasant View	1949-66	[a]420	1	1.1	0.2	0	0	0	0
				7	1.3	0.3	0	0	0	0
				14	1.7	0.4	0.1	0	0	0
				30	2.8	1.0	0.4	0.1	0	0
6-9210	Pomme de Terre R. near Bolivar	1951-65	225	1	4.0	1.5	0.7	0.3	–	–
				7	5.1	2.3	1.3	0.7	–	–
				14	6.5	3.4	2.2	1.4	–	–
				30	9.2	5.6	3.9	2.7	–	–
6-9215.8	South Grand River near Freeman	1962-65, 1967	–	7	0.2	–	0	–	–	–
6-9215.9	South Grand River at Archie[e]	1943, 1945, 1947, 1949, 1952, 1954, 1962-64	–	7	0.4	–	0	–	–	–
6-9216	South Grand River at Urich[g]	1961-66	670	7	1.4	–	0	–	–	–
6-9217.2	Big Creek at Blairstown[g]	1960-66	414	7	1.1	–	0	–	–	–
6-9217.8	Deepwater Creek near Montrose[e]	1955, 1962-64	–	7	0	–	0	–	–	–
6-9220	South Grand River near Brownington	1922-65	[a]1,660	1	1.8	0.2	0	0	0	0
				7	3.8	0.4	0.1	0	0	0
				14	7.1	0.8	0.2	0.1	0	0
				30	21	3.5	1.1	0.4	0.2	0.1
6-9270.5	Middle River near Mokane[e]	1962-64	–	7	0.4	–	0	–	–	–
6-9273.0	Auxvasse Creek near Steedman	1962-65, 1967	–	7	0.5	–	0	–	–	–
6-9355	Loutre River at Mineola	1948-65	202	1	0.5	0.1	0	0	0	0
				7	0.7	0.1	0	0	0	0
				14	1.2	0.2	0.1	0	0	0
				30	2.7	0.5	0.2	0.1	0	0
6-9357.3	St. John Creek near Washington[e]	1962-63	–	7	0.6	–	0	–	–	–

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
6-9357.5	Femme Osage Creek nr. Weldon Springs[e]	1961-63, 1967	–	7	0.6	–	0	–	–	–
6-9359	Creve Coeur Creek at Creve Coeur[e]	1961-64	–	7	1.4	–	0	–	–	–
	LOWER MISSISSIPPI RIVER BASIN									
7-0101	Gravois Creek near Kirkwood	1961-65, 1967	–	7	0.6	–	0	–	–	–
7-0210	Castor River at Zalma	1922-66	423	1	46	32	25	21	19	17
				7	52	35	29	23	21	19
				14	56	38	31	25	23	20
				30	64	43	34	28	25	23
7-0216	Whitewater River at Whitewater	1921-26, 1961-65, 1967	–	7	23	–	11	–	–	–
7-0218	Headwater Diversion Channel at Allenville	1951-61, 1963-65, 1967	982	7	96	–	48	–	–	–
7-0241	Main Ditch Lateral 2 nr East Prairie	1958-61, 1963-65, 1967	97.3	7	8.6	–	3.6	–	–	–
7-0241.5	St. James Ditch at East Prairie	1958-61, 1963-65, 1967	17.5	7	1.0	–	0.2	–	–	–
7-0241.7	Maple Slough near East Prairie	1958-61, 1963-65, 1967	25.4	7	2.6	–	1.0	–	–	–
7-0400.5	Lick Creek near Dudley[e]	1958, 1960-61, 1964	56.9	7	0	–	0	–	–	–
7-0404.7	Kinnemore ditch at Cardwell[e]	1958-61, 1963-64	11.5	7	0.2	–	0	–	–	–
7-0407	Ditch 9 near Gideon	1958-61, 1963-65, 1967	59.6	7	1.6	–	0.1	–	–	–
7-0408	Main ditch 6 east of Malden	1958-61, 1963-65, 1967	28.0	7	0.9	–	0.1	–	–	–
7-0408.5	Main ditch near Bernie	1958-61, 1963-65, 1967	31.7	7	0.5	–	0.2	–	–	–
7-0409	Main ditch 2 near Malden	1958-61, 1963-65, 1967	15.2	7	16	–	8.8	–	–	–
7-0410	Little River ditch 81 near Kennett	1927-65	111	1	50	29	20	15	12	9.6
				7	55	33	23	17	14	12
				14	61	37	28	22	19	16
				30	68	45	36	29	26	23

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	50	30	50
7-0410.5	Main ditch near Malden	1958-61, 1963-65, 1967	28.6	7	8.1	–	4.0	–	–	–
7-0411	Main ditch at Holcomb	1958-61, 1963-65, 1967	96.1	7	30	–	13	–	–	–
7-0420	Little River ditch 1 near Kennett	1927-65	235	1	48	26	19	15	13	11
				7	54	31	23	18	15	13
				14	60	35	26	20	18	15
				30	70	42	32	26	22	19
7-0424	Main ditch 1 near Matthews	1958-61, 1963-65, 1967	62.0	7	33	–	26	–	–	–
7-0425	Little River ditch 251 near Lilbourn	1946-65	235	1	86	60	50	45	43	–
				7	92	64	54	49	47	–
				14	100	70	58	52	50	–
				30	110	78	66	59	56	–
7-0430	Castor River at Aquilla	1946-65	175	1	1.5	0.5	0.2	0.1	0.1	–
				7	2.1	0.7	0.4	0.2	0.2	–
				14	3.0	1.0	0.6	0.4	0.3	–
				30	5.6	2.3	1.5	1.1	0.9	–
7-0430.5	Ditch 24 at Heagy	1958-61, 1963-65, 1967	36.8	7	22	–	16	–	–	–
7-0431	Old Channel ditch 1 near Chaffee	1958-61, 1963-65, 1967	41.4	7	2.7	–	0.8	–	–	–
7-0435	Little River ditch 1 near Morehouse	1946-65	450	1	72	49	42	39	38	–
				7	77	52	44	41	40	–
				14	86	57	47	44	42	–
				30	100	66	54	49	48	–
7-0439	Meander Line ditch near Portageville[e]	1958-61, 1963-64	–	7	1.3	–	0.5	–	–	–
7-0460	Little River ditch 259 near Kennett	1927-65	89	1	4.8	0.5	0.2	0	0	0
				7	5.7	0.8	0.2	0.1	0	0
				14	6.7	1.0	0.3	0.1	0.1	0
				30	7.8	1.6	0.5	0.2	0.2	0.1
7-0465.1	Pemiscot Bayou near Holland	1958-61, 1963-65, 1967	144	7	40	–	(d)	–	–	–
7-0465.2	Main ditch 1 near Deering	1958-61, 1963-65, 1967	66.4	7	15	–	6.6	–	–	–
7-0465.5	Buffalo ditch near Arbyrd	1958-61, 1963-65, 1967	38.7	7	17	–	5.6	–	–	–
7-0507	James River near Springfield	1956-65	246	1	8.0	2.4	1.2	0.6	–	–
				7	9.6	3.2	1.7	1.0	–	–
				14	12	4.0	2.1	1.2	–	–
				30	17	6.2	3.4	2.0	–	–

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
7-0515	James River below Battlefield[b]	1929-32	328	7	24	–	7.5	–	–	–
7-0523	Finley Creek near Ozark	1943, 1946-47, 1952, 1962-67	–	7	23	–	7.4	–	–	–
7-0525	James River at Galena	1922-66	987	1	120	68	42	23	16	9.8
				7	135	76	47	26	18	12
				14	150	88	56	32	22	14
				30	190	110	70	41	29	19
7-0527.5	Flat Creek at Cassville	1944-46, 1949, 1952, 1956, 1962-67	–	7	5.2	–	1.8	–	–	–
7-0528	Flat Creek at Jenkins	1942, 1962-67	–	7	34	–	13	–	–	–
7-0538	Bull Creek at Walnut Shade	1943, 1945-47, 1949, 1952, 1954, 1962-67	–	7	5.5	–	0.8	–	–	–
7-0539.8	Swan Creek at Forsyth	1923, 1930-32, 1938, 1941, 1962-67	–	7	9.5	–	1.2	–	–	–
7-0631.0	Lake Slough near Qulin	1958-61, 1963-67	78.0	7	8.0	–	(d)	–	–	–
7-0631.3	Menorkenut Slough near Qulin	1958-61, 1963-67	33.5	7	1.8	–	(d)	–	–	–
7-0631.7	Ditch 22 near Qulin[e]	1958-61, 1963	14.4	7	0	–	0	–	–	–
7-0635	Cane Creek at Harviell[e]	1939-42, 1958-61, 1963-67	188	7	11	–	6.5	–	–	–
7-1854	Williams Creek near Mount Vernon	1954, 1962-65, 1967	–	7	6.6	–	3.4	–	–	–
7-1856.5	Spring River near Stotts City	1943-44, 1946-47, 1949, 1954, 1962-65, 1967	–	7	62	–	26	–	–	–
7-1857	Spring River at Larussell	1957-67	306	1	60	39	31	27	–	–
				7	66	43	34	30	–	–
				14	71	47	37	32	–	–
				30	81	52	41	35	–	–
7-1857.5	White Oak Creek near Avilla[e]	1954, 1962-64	–	7	0	–	0	–	–	–
7-1858	Spring River near Neck City[e]	1954, 1962-64	–	7	58	–	(d)	–	–	–

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
7-1858.5	North Fork Spring R. at Lamar[e]	1943, 1946, 1962-63	–	7	0.2	–	0	–	–	–
7-1860	Spring River near Waco	1925-66	1,164	1	74	36	22	12	8.8	5.3
				7	90	46	28	17	12	7.4
				14	100	56	36	22	16	10
				30	130	70	45	28	21	14
7-1861	Center Creek near Sarcoxie	1954, 1962-65, 1967	–	7	22	–	9.5	–	–	–
7-1862	Center Creek near Fidelity	1962-64, 1967	–	7	37	–	12	–	–	–
7-1864	Center Creek near Carterville[g, h]	1962-66	232	7	40	–	[f]10-15	–	–	–
7-1864.2	Center Creek near Webb City[e, h]	1962-64, 1966	–	7	51	–	[f]15-20	–	–	–
7-1864.6	Center Creek near Carl Junction[h]	1943, 1946, 1949, 1952, 1954, 1956, 1962-67	–	7	56	–	[f]20-25	–	–	–
7-1867	Shoal Creek near Fairview	1954, 1962-67	–	7	20	–	8.8	–	–	–
7-1868	Capps Creek near Berwick	1962-67	–	7	24	–	13	–	–	–
7-1868.5	Clear Creek near Ritchey	1954, 1962-67	–	7	9.2	–	3.6	–	–	–
7-1868.8	Shoal Creek at Ritchey	1954, 1962-67	–	7	68	–	26	–	–	–
7-1868.9	Shoal Creek at Neosho	1941-43, 1945-46, 1949, 1952, 1954, 1962-65, 1967	–	7	70	–	29	–	–	–
7-1869	Hickory Creek at Neosho	1941, 1962-65, 1967	–	7	12	–	4.9	–	–	–
7-1870	Shoal Creek above Joplin	1942-66	410	1	105	60	40	26	20	–
				7	115	65	44	29	22	–
				14	125	72	49	33	25	–
				30	145	88	62	42	33	–
7-1885	Lost Creek at Seneca	1949-59	42	1	6.0	1.7	0.6	–	–	–
				7	6.6	2.2	0.9	–	–	–
				14	8.1	2.8	1.2	–	–	–
				30	9.5	3.3	1.5	–	–	–
7-1888.5	Elk River at Pineville	1942, 1945, 1947, 1949, 1952, 1962-65, 1967	–	7	41	–	8.8	–	–	–

Station Number	Station Name And Location	Record Used In Analysis	Drainage Area (sq. mi.)	Period (days)	Seasonal low-flow, in cubic feet per second, for indicated recurrence interval in years. 2	5	10	20	30	50
7-1888.7	Indian Creek at Anderson	1942, 1945, 1947, 1949, 1952, 1962-65, 1967	–	7	50	–	15	–	–	–
7-1890	Elk River near Tiff City	1940-66	872	1	80	39	23	12	7.4	–
				7	88	43	25	13	8.2	–
				14	102	49	29	15	9.8	–
				30	132	68	42	24	16	–
7-1891	Buffalo Creek at Tiff City[e]	1954, 1962-64	–	7	7.0	–	0	–	–	–

a Approximately.
b Discontinued continuous-record station.
c Discontinued continuous-record station which is currently operated as a partial-record station.
d Insufficient data for estimate.
e Discontinued partial-record station.
f Range in discharge estimated on basis of frequency curve slopes for nearby continuous-record stations and extension of regression curves.
g Short-time continuous-record station which was analyzed as a partial-record station due to scant data.
h Estimates affected to a limited extent by augmentation from industrial effluent.

INDEX OF STATION NAMES

(*Indicates continuous-record station)

INDEX OF STATION NAMES (Continued)

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*Indicates continuous-record station.